

REMARKS

Claims 1-17, 21 and 24-25 were previously pending. Reconsideration of presently pending claims 1-17, 21, and 24-25 is respectfully requested in light of the following remarks.

Rejections under 35 U.S.C. §112

Claims 12 and 21, and the claims that depend therefrom, were rejected under 35 U.S.C. §112, first paragraph, as failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. The Examiner argues that the “in the specification the first metal is defined as layer (208) that is formed above the first glue layer (206). It is not clear how an interface is formed directly between the first metal layer (208) and a lower surface of the glue layer (206).” The Applicant’s respectfully disagree as to this interpretation.

The adjectives of “first” and “second” in the claim language are used to differentiate two claimed layers. The designations first and second provide no limitations other than to distinguish the two layers from one another within the claim by providing a symbolic representation that allows for distinguishing the layers. The Examiner is misplaced in bringing in limitations from the specification with use of an ordinal number in this manner.

For example, see *3M Innovative Properties Company v. Avery Dennison Corp.*, 350 F.3d 1365, (Fed. Cir. 2003) providing:

“The use of the terms “first” and “second” is a common patent-law convention to distinguish between repeated instances of an element or limitation. [citations removed] In the context of claim 1, the use of the terms “first . . . pattern” and “second . . . pattern” is equivalent to a reference to “pattern A” and “pattern B,” and should not in and of itself impose a serial or temporal limitation onto claim 1.”

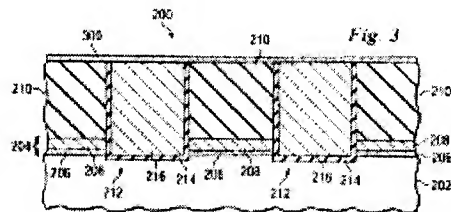
Also see, MPEP 2173.05(e) providing:

“[t]here is no requirement that the words in the claim must match those used in the specification disclosure. Applicants are given a great deal of latitude in how they choose to define their invention so long as the terms and phrases

used define the invention with a reasonable degree of clarity and precision.”

Clearly one would understand the claims 12 and 21 to describe with sufficient clarity and precision the claimed structure as one skilled in the art would certainly realize the use of “first” and “second” in their generic sense differentiation symbols.

With this in mind, the limitations are supported in the specification at least by Fig. 3, reproduced below, and the written description accompanying Fig. 3. For example, a metal layer 214/216 is adjacent a dielectric layer 210; a glue layer 300 is on the dielectric layer 210 and the metal layer 214/216; an interface (denoted above as interface 1) formed directly between the metal layer 214/216 and a lower surface of the glue layer 300; and an interface (denoted above as interface 2) is formed directly between the dielectric layer 210 and a lower surface of the glue layer 300.



Thus, for at least this reason, the rejection of claims 12 and 21, and the claims that depend therefrom should be withdrawn. As no other rejections of claims 12 and 21 have been provided, the Applicants kindly request a notice of allowance.

Rejections under 35 U.S.C. § 102

Claim 25 is rejected under 35 U.S.C. §102(b) as being anticipated by Tsai et al. (US Patent No. 6,355,558 hereinafter referred to as “Tsai”). As set forth at MPEP §2131, it is well-established:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

With respect to the claims as herein amended, this rejection is respectfully traversed.

Claim 25 requires in part:

A method...comprising: forming a first metal layer; forming a glue layer directly on the first metal layer, wherein the glue layer is an etch stop layer

...performing an inter-treatment on the glue layer to alter the upper and lower surfaces of the glue layer...

The Examiner states that Tsai teaches a first layer 104 on which a glue layer 106 is formed. The Examiner continues to state that “the glue layer is an etch stop layer and includes silicon (layer 106 is formed of silicon carbide)...” As such, the Examiner provides no indication of the provisions of Tsai providing that the cap layer 106, argued by the Examiner to disclose a glue layer, is an etch stop layer. Furthermore, in Figs. 1A-1E cited by the Examiner as disclosing claim 25, it is clear that the glue layer 106 is not illustrated as providing an etch stop layer function. See, for example, Fig. 1E.

Furthermore, the Examiner states that the inter-treatment is provided by the surface treatment 108 in Tsai. The surface treatment 108 however clearly provides for a hydrophilic surface 110 illustrated in Fig. 1E as the upper surface. Applicants find no disclosure in the Figures or portions of the specification referenced by the Examiner indicating a lower surface of the glue layer would be affected, as is required by claim 25. As such, Tsai does not teach all the elements of claim 25. Therefore, the rejection is not supported by the Tsai reference and should be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1-4 and 6-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmitt et al. (US Patent No. 6,913,992, hereinafter “Schmitt”) in view of Tsai. Applicant traverses these rejections on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to the referenced claims.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

1. Even when Combined, the References do not Teach the Claimed

Subject Matter

The combination of Schmitt and Tsai does not meet all elements of independent claim 1. The combination of the structures of Schmitt and Tsai would provide for two interconnection structures such as provided by interconnect structure 104 and interconnect structure 118 in Fig. 1E of Tsai. Furthermore, as illustrated in Tsai, between the two interconnect structures exists an adhesion promoter layer, such as is illustrated by 112 of Tsai, formed on a treated cap layer, such as shown by the cap layer 106, argued by the Examiner to disclose a glue layer. The combined structures would include a low k etch stop layer such as illustrated by 114/115 of Schmitt, argued by the Examiner to disclose a glue layer, adjacent the interconnect structure 104 (in particular lying at the plane parallel the top of the via portion of the structure 104). As such, the combination still does teach all elements of independent claim 1. For instance, a glue layer formed directly on a first layer including a metal layer, and a second layer also including a metal layer deposited directly on glue layer is not formed as required by claim 1. Specifically, a treated glue layer formed between two metal layers with direct interfaces to each, is not formed.

2. There is no Reason to Combine

Recently, the Supreme Court ruled that the "teaching, suggestion, or motivation (TSM) test" still applies, but should be used in a more "expansive and flexible" manner. *KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. ___, 11 (2007). The Court stated that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.* at 14-15, emphasis added.

The Examiner has not provided a valid reason for combination. He states "it would have been obvious...to incorporate the first layer including the metal layer taught

by Tsai in the process of Schmitt in order to form a multilevel interconnect with improved surface wettability.” However, replacement of the first layer, identified by the Examiner to be dielectric layer 110 with metal would render the structure disclosed by Schmitt unworkable. Figs. 2A-2H, cited by the Examiner in his rejection, provide for fabrication of a dual damascene formed interconnect structure. See Col. 12, lns. 8-15. The dielectric layer 110 provides isolation for the contact/via structure 116. Providing metal in lieu of the dielectric layer 110 would provide electrical contact (e.g., causing a short) to the contact/via structure 116 thus destroying the functionality of the dual damascene formed interconnect. As such, there is no motivation to combine Schmitt and Tsai and the rejection should be withdrawn for at least these reasons.

Dependent Claims

Dependent claims 2-11, 13-17, and 24 depend from and further limit what are considered to be allowable claims, as such they are deemed to be patentable over the prior art.

Conclusion

An early formal notice of allowance of claims 1-17, 21, 24, and 25 is requested. The Examiner is invited to telephone the undersigned if further assistance is necessary.

Respectfully submitted,



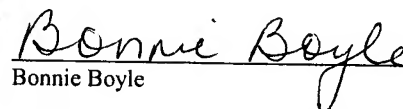
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